

Big Oil Seeks IT Standards

By Stuart J. Johnston

*'Do more
with less,'
is today's
mantra;
to that
end, IT is
playing a
pivotal
role*

THE NEXT YEAR is bound to see big changes in the oil and gas business as more energy companies merge or form partnerships with competitors. At the same time, technology managers will face escalating pressure to provide more useful IT services at lower costs.

The oil and gas business has long been highly competitive, and it's getting more so by the day. "There is a very strong requirement to lower cost while producing higher reliability, and providing global reach and infrastructure services," says Jim Crompton, principal technology adviser at Chevron Information Technology Co., Chevron Corp.'s IT arm.

Today, doing more with less reigns supreme in the oil and gas industry. That mantra is behind several technology trends, all of which are interrelated.

If there is one overriding trend, says Bill Miller, a partner in the Americas energy practice at Andersen Consulting's Houston office, it is a "tremendous pressure to bring costs down." However, he says, "It's difficult to isolate a single trend, because they're all coupled."

One of these linked trends is a movement to decrease the amount of custom code used, and increase the amount that is standard across the industry. For instance, several oil companies are in the process of deploying IS-Oil, a common set of core business applications based on SAP's R/3 3.0 applications set. A consortium of 21 oil companies, in partnership with Andersen and SAP, aims to help contain costs.

Deployment of IS-Oil has just begun, and it

will be several years before all the 21 companies have implemented it throughout their enterprises. "That process started one to two years ago and will continue through the year 2005," says Miller.

Chevron will be the first to implement IS-Oil on the "upstream" side—finding and extracting oil and gas deposits—although other major energy companies are sure to be close behind, says Crompton.

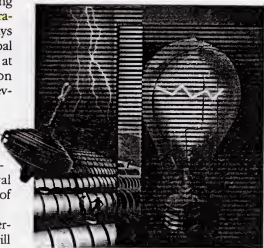
IS-Oil is only one of many enterprise

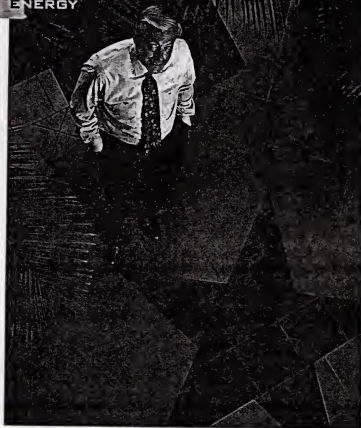
resource planning applications finding their way into the oil and gas companies. Because of their large size and wide variety of business activities, energy companies have a huge investment in IT. But applications suites that let IT oversee the entire enterprise have been lacking. In this respect, fixing the year 2000 date-field problem has served

to push innovation at many oil and gas companies.

Confronted with the choice of fixing older programs they need to run their businesses or deploying new ones to take over those tasks—while at the same time providing enhanced oversight on the enterprise—many companies are choosing the latter. "The year 2000 will force companies to look at software that they wouldn't have looked at two years ago, and IS-Oil is a perfect example," says Scott Albrow, a senior analyst at IT advisory firm G2 Research Inc. in Mountain View, Calif.

"A lot of companies have decided that rather than just fix the year 2000 problem,





"Let's go to client-server," says Miller.

Nevertheless, IT managers in this industry are not entirely sold on the move to client-server. Between the year 2000 and the need to consolidate systems as more companies merge, to some it seems like swimming to stay in place.

Consolidation projects and fixing year 2000 problems "consume resources, and they don't gain you anything. You just get back to where you started," says Gary Richardson, director of IT at Star Enterprise, a joint ven-

*Star's
Richardson
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ture of Texaco Inc. and Saudi Aramco, which sells Texaco's products in the Eastern and Gulf Coast states.

That ties in with another growing trend: a move by some energy companies to migrate more business applications onto Microsoft's Windows NT as well as onto stalwarts such as Unix. "When we've looked at SAP, NT is the application server of choice on over half the shipments," says Dan Kusnetzky, director of the client and server environments programs at advisory firm International Data Corp. in Framingham, Mass.

That doesn't mean that NT is undercutting Unix, since Unix shipments continue to grow as well. In fact, fixing the year 2000 problem and moving to applications suites may play in both NT's and Unix's favor, in the oil and gas industries and others.

Train Once, Run Anywhere

But that could change over time if NT's penetration continues. "NT runs the same on any vendor's system, and that answers a lot of problems for companies because you train your users once and they can run their applications anywhere. It would also diminish operations costs," Kusnetzky adds.

However, even companies that have made a large commitment to NT, such as Chevron, will still deploy IS-Oil on Unix. "It was probably more of a comfort factor for Unix rather than a technical issue because the decision was made three or four years ago," says Chevron's Crompton. "It takes a long time to deploy technology like that in a company of our scale."

Indeed, NT still has a lot to prove before most IT departments trust it with applications such as IS-Oil, says Andersen's Miller. "I don't

TECHNOLOGY CLOSE-UP

RANK	COMPANY	IT BUDGET (1997)	IT BUDGET (1996)	IT EMPLOYEES	YEAR 2000 READY	% OUTSOURCING	% INTERNET	SELLING ON WEB	PROCUREMENT ON WEB
49	WMA Technologies Inc.	\$100,000,000	\$100,000,000	350	30%	5%	5%	Y	Y
87	Texaco Inc.	\$284,000,000	\$287,000,000	1,240	80%	12%	2%	N	N
112	Ashland Inc.	\$100,000,000	\$100,000,000	800-750	25%-30%	10%	<1%	N	N
130	Unocal Corp.	\$70,000,000	\$100,000,000	200	30%	40%	4%	N	N
134	Tenneco Inc.	\$102,000,000	\$93,000,000	1,000	70%	10%	2%	Y	Y
185	Coastal Corp.	\$40,000,000	\$40,000,000	400	20%	10%	---	N	Y
268	El Paso Natural Gas Co.	\$65,000,000	\$85,000,000	400	---	---	---	N	N
307	Phillips Petroleum Co.	\$300,000,000	\$257,000,000	800	17%	20%	2%	N	Y
381	Koch Industries Inc.	\$110,000,000	\$100,000,000	---	75%	10%	15%	N	Y
430	Centor Energy Corp.	\$30,000,000	\$32,000,000	200	75%	40%	1%	N	N
493	Seaco Corp.	---	---	250	50%	5%	5%	N	Y

Year 2000 Ready is company-estimated percentage of software code that is year 2000 compliant. % Outsourcing is percentage of company's IT budget spent on outsourced projects. % Internet is percentage spent on online activities. Selling on Web: Company is selling products and services through its Web site (handling the actual transaction online and shipping orders, but not necessarily payment). Procurement on Web: Company is procuring supplies or materials over the Internet. Industry companies not listed decided to participate in the InformationWeek survey. Missing information was not provided by surveyed companies.

Photos by Anthony R. Piro

think you're going to see them jump on the NT bandwagon just yet."

For now, NT is gradually working its way into the hearts of IT managers, but Unix still maintains its hold. The introduction of Microsoft's enterprise editions of NT Server and SQL Server may change this situation. While NT has succeeded as an application and department-level server, it has been repeatedly stymied in taking over enterprise applications because of its lack of scalability—both real and perceived.

The Enterprise Edition of NT Server, due this month, will let NT run on machines with as many as eight processors and cluster a pair of machines together so one takes over the other's tasks if it fails. Enterprise Edition of SQL Server will be able to handle up to 1 terabyte of data, moving it closer to the levels of data storage and access required by companies with huge data stores.

"I certainly want NT to work for a lot of reasons, including that it is the cheapest and the best operating system out there today," says Richardson. "Scalability is still a problem. In 1997, will NT be the central server? No. But, in the year 2000, you may see NT invading the upper levels of Unix."

In Focus

Meanwhile, the adoption of products such as IS-Oil will help oil and gas companies oversee their entire enterprises. "ERP runs dead last in terms of current systems adequacy,

so that's why they see a big opportunity there," says G2 Research's Albino. "The great thing is that these integrated applications suites let people throughout the organization, but especially in the executive suite, get an overview of the whole business. ERP is about access to information and, in particular, about access to financial information."

Broad access is extremely important in hard-pressed oil and gas companies that constantly feel the pressure of falling profit margins and the accompanying mandate to drive

INDUSTRY SNAPSHOT

BUSINESS AND TECHNOLOGY TRENDS

- Standardized applications allow companies to view the enterprise as a whole.
- Year 2000 considerations drive moves to ERP applications and Windows NT.
- Common systems and formats encourage data sharing among suppliers and partners.
- % REVENUE SPENT ON IT: 1%
- IT SPENDING PER EMPLOYEE: \$5,405
- EMPLOYEES DEDICATED TO IT: 2.4%
- % IT BUDGET FOR ONLINE INITIATIVES: 4.1%
- % IT BUDGET FOR OUTSOURCING: 16.2%
- YEAR 2000-COMPLIANT CODE: 45%
- APPS ACCESSIBLE ONLINE: 3%
- COMPANIES THAT SELL ONLINE: 18%
- COMPANIES THAT PROCURE ONLINE: 54%

BASED ON SURVEY OF 10,000 ENERGY COMPANIES.
DATA: INFORMATIONWEEK

RANK 1997	RANK 1996	COMPANY	REVENUE (\$ MILLIONS)	INCOME (\$ MILLIONS)	TOTAL EMPLOYEES
49	23	WMX Technologies Inc.	\$10,322	\$192	50,000
74	93	Chevron Corp.	\$38,691	\$2,607	40,820
78	79	Amoco Corp.	\$32,726	\$2,834	127,000
87	99	Texaco Inc.	\$44,561	\$2,018	29,000
112	92	Ashtond Inc.	\$13,100	\$211	35,000
130	179	Unocal Corp.	\$5,328	\$628	8,000
134	53	Tenneco Inc.	\$10,982	\$218	45,000
162	178	Occidental Petroleum Corp.	\$10,557	\$698	14,300
163	164	Mobil Corp.	\$72,267	\$2,964	43,000
164	204	Halliburton Co.	\$7,385	\$300	60,000
185	158	Coastal Corp.	\$12,200	\$500	16,000
195	233	Atlantic Richfield Co.	\$18,600	\$1,700	22,800
220	182	Exxon Corp.	\$119,434	\$7,510	79,000
266	---	El Paso Natural Gas Co.	\$3,000	\$98	3,500
307	303	Phillips Petroleum Co.	\$15,800	\$1,300	17,000
381	436	Koch Industries Inc.	\$13,000	---	13,000
408	447	Columbia Gas System Inc.	\$3,354	\$222	9,600
430	---	Centerior Energy Corp.	\$2,500	\$121	6,300
437	---	Williams Cos. Inc.	\$3,531	\$362	14,000
464	---	Sun Co. Inc.	\$9,875	(\$115)	12,150
493	---	Scana Corp.	\$1,513	\$215	4,000

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ERP packages also provide a common data format that allows companies to share necessary information with suppliers and partners. "We've been saying for a long time that we need business process reengineering and all of those things, and if IS-Oil is a manifestation of that, then that's a positive," says Star's Richardson.

With the constant drive to lower costs, it should also be no surprise that more IT functions are being outsourced. Chevron Corp., for instance, just inked a deal with Vanstar Corp. to outsource PC and helpdesk management. It also will lease its desktop PCs and notebooks—a total of more than 30,000 machines—on a three-year rotating basis from Hewlett-Packard. The total value of the contract is in the neighborhood of \$200 million.

To Outsource Or Not To Outsource

Oil and gas companies are still learning which functions can be effectively outsourced and which cannot. The lure of outsourcing, of course, is replacing staffing costs, which can be large and unpredictable, with a fixed-cost contract. But the downside is that the fixed-cost contract can turn into a nightmare of finger-pointing and buck-passing as each outsourcer says a specific problem is not covered under its agreement.

Outsourcing is really tough because each firm only does one facet of it, so what one group currently does internally might require several different outsource firms. One midlevel manager at a large oil company that outsourced its communications network to a major service provider says the arrangement "didn't really work out and we eventually took it back."

Andersen's Miller feels a lot of guesswork has gone into outsourcing. "If you look at the outsourcing that has been done in the past, you don't see a lot of cost reduction," he says. "People guessed what it made sense to outsource."

G2's Albro notes that outsourcing is "still an area where it's open season and nothing has been decided" about what functions should be taken over by outside companies. "What happens when users start looking at outsourcing is a cost/benefit analysis, and there is a definite pullback."

"My whole labor structure has been discombobulated, because 50% to 60% of my technical coding resources are contracted," says Star's Richardson, adding that contractors cost double what an employee does. But he sees no solution to the problem as schedules for accomplishing projects shrink drastically and specialists, such as competent R/3 programmers, are needed to implement a project but later are no longer required.

"Faster is a trend," Richardson declares. "Now six weeks is the answer to the question—not a year."



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PROCESS MANUFACTURING

Major business drivers and trends in process manufacturing are summarized in the following table:

Key Business Drivers	Key Trends
<ul style="list-style-type: none"> • Cost pressures • Stricter regulatory enforcement • Globalization of manufacturing/sales • Wider acceptance of available technology 	<ul style="list-style-type: none"> • Cost reduction measures • Business process re-engineering • Strategic restructuring • Integration of environmental, health and safety issues into business planning • Global supply chain integration • Popularity of EDI, interactive voice response, and other forms of electronic commerce • Growing use of the Internet • Drug distribution becoming an information business

Major segments include oil/gas exploration and refining, chemicals, food and consumer products, pharmaceuticals, and tobacco products. Petrochemicals are covered in more depth in a separate profile. The SIC codes are 10-33.

Business Drivers and Trends:

1. Process manufacturing is a diverse sector, ranging from oil and gas refining, to manufacture of intermediate products like industrial chemicals, to production of consumer-based goods like pharmaceuticals, food and consumer products. In spite of this diversity, there are business drivers that cut across all industry lines, such as the increasing **cost pressure** and tight operating margins which are forcing organizations to take a closer at business processes. In the oil and gas arena, refining as well as marketing margins remain weak, and chemical manufacturers are in the midst of a downturn in profitability which is predicted to last until 2001 (*Chemical Week*). *Chemical Week* reports that implementation of cost reduction measures, process efficiencies and new technologies will be key to survival for chemical manufacturers during this lean period. In the past, business process re-engineering (BPR) was viewed as a single, one-time event. In the past few years, many organizations such as DuPont, Colgate-Palmolive, The Pillsbury Company and Dow Chemical have recognized it as an ongoing process that requires daily management attention and have made an ongoing, long term commitment to looking at their business for cost improvement opportunities.
2. The chemicals industry continues to restructure through acquisitions, divestments, and joint ventures due to declines in profitability, although growth in demand remains strong. One example of restructuring in the food industry is the recent sale of the Alba product line by the H.J. Heinz Company. According to Irvin Simon, President of Heinz, this was part of an effort to streamline operations - Alba products are sold through grocery product distributors and not through Heinz normal direct distribution channels. (*PR Newswire*)
3. Many of the process manufacturing industries are deeply affected by governmental regulations and **stricter enforcement by regulatory agencies** -- food industries by the Food and Drug Administration (FDA), pharmaceuticals by the Drug Enforcement Agency (DEA), and oil, gas and chemicals by the Environmental Protection Agency (EPA). The President of Arco Chemicals recently stated that due to stricter enforcement, "there is a growing integration of environment, health and safety into mainstream business planning and activity". In fact, Arco's Manufacturing Excellence initiative, which is their



"blueprint for streamlining and increasing efficiency", includes measures for safety and environmental performance, as well as more traditional business measures of efficiency, reliability, customer satisfaction. (speech from Arco website)

4. In response to both customer demand and cost pressures, manufacturers are looking for ways to reduce cycle times through tighter integration of their supply chain, primarily among suppliers, manufacturing operations and finished goods distribution. Better information management is key to supply chain management. **Worldwide production** as well as **increased export sales** means that organizations must find ways to manage their supply chain not only on a national, but also a worldwide scale.
5. **Wider acceptance of available technology** is giving companies more efficient and accurate ways to manage transactions throughout the supply chain as well. Technologies like EDI, interactive voice response, and electronic data collection devices allow manufacturers to automate certain transactions and eliminate needless paper handling. The Internet technologies allow manufacturing operations to share information across sites and departments, as well as provide customers and suppliers a low cost, easily maintainable vehicle for collecting and distributing information.
6. According to *Drug Topics*, the drug distribution business is becoming more of an information business than a product supplier business, another reason that information technology is playing a greater role. For example, in September the Japanese subsidiary of Pfizer International will launch an integrated drug information system to personnel throughout the company, to include product and academic drug information, a customer data base, and an advanced customer market research system for analyzing market trends (*Japan Chemical Week*).

Major Trade Associations:

- Chemical Manufacturer's Association.- industrial chemicals mainly, with a few pharmaceutical companies. (703) 741-5000. www.cmaahq.com
- Chemical Specialties Manufacturers' Association - covers household, automotive, lawn care chemicals primarily. (202) 872-8110. no website
- www.performancechemicals.com/rcpdem/1_basic.html - hotlinks to websites of numerous major international chemicals companies
- Pharmaceutical Research and Manufacturer's Association. (202) 835-3400. www.phrma.org
- Food Marketing Institute. (202) 452-8444. www.fmi.org



PETROCHEMICAL

Major business drivers and trends in the petrochemical sector are summarized in the following table:

Key Business Drivers	Key Trends
<ul style="list-style-type: none"> • Global nature of business • Cyclical nature of commodities • Declining profits 	<ul style="list-style-type: none"> • Restructuring of world markets • Expansion into developing countries • Consolidation • Cost reduction measures • Re-engineering

Segments include commodity chemicals used by industry and consumer product chemicals. The SIC codes for petrochemicals are 28-29.

Business Drivers and Trends:

1. The petrochemical industry is by nature a **global business**, with processing taking place near sources of supply. As a commodity-based business, petrochemical **markets are cyclical**, and affected by global supply and demand. "Cyclical plunges in chemical margins continue to drive a **restructuring of the chemical industry worldwide**", according to *Oil Daily*. For these reasons, quarterly performance also varies on a product-by-product basis. Overcapacity in world markets and weak prices have dragged down profits for some products such as tioxide, paraxylene and purified terephthalic acid, while markets for other products such as polyester are fast-growing and strong (*Wall Street Journal*).
2. However, in general, **profits in the U.S. petrochemical industry are expected to decline in 1997** as global capacity increases, according to a Paine Webber analyst, although volume increases have helped to compensate. He estimates that capacity will increase in the U.S. by 6% in 1997 and 1998, by 3% in Europe and by 8% in Asia. This will likely lead to a battle for market share, resulting in lower prices and margins. In order to survive, U.S. companies will expand into developing countries, primarily Asia and Latin America.
3. *Chemical Week* reports that an increase in petrochemical prices could return in 2001, with profitability catching up in 2002. "While this is a familiar business cycle to petrochemical executives, cost reductions measures, alliances and re-engineering techniques will test the efficacy of the companies during this lean period".
4. U.S. petrochemical companies are being transformed or strongly affected by consolidation at both the national and global level, primarily in response to lower margins and strategic restructuring. On the national level, Texaco sold off its last petrochemical derivatives complex in early 1997, allowing the company to focus on its core oil and gas business. (*Chemical & Engineering News*)
5. Global acquisitions are helping companies restructure for better positioning in a specific market, as well as to re-focus core business. In a major worldwide expansion, DuPont Co. recently agreed to acquire large parts of Britain's Imperial Chemical Industries PLC (ICI) (*Wall Street Journal*). The acquisition will provide DuPont Co. with a strong position in the fast-growing \$30 billion polyester industry. Just a few months earlier, ICI had acquired Unilever's specialty chemicals business - a move made to help Imperial Chemical Industries shift its business from lower-profit industrial chemicals to faster-growing consumer product chemicals.

Major Trade Associations:

- Chemical Manufacturer's Association. (703) 741-5000. www.cmahq.com
- www.performancechemicals.com/rcpdem/1_basic.html - hotlinks to websites of numerous major international chemicals companies



SERVICE TRENDS

TREND	EXAMPLE/EVIDENCE	TRENDSSETTERS	IMPLICATIONS
Overall:			
Cost pressures	Chevron and others transfer staff to vendor; others sell IT assets		Customers view outsourcing as HR and cost solution
Customer groups accept common service/solution	ETAP - group led by BP exploits marginal fields by pooling resources	ETAP/EDS	New opportunities will emerge from new groupings for common problems
Selective outsourcing	Nova Gas Transm. retains responsibility for SAP R/3 implementation; Mobil takes in-house approach but outsources Y2K		
Application Management:			
Consolidation, partnering driving demand for common systems, interoperability	More adoption of standardized suites, e.g. demand for SAP R/3	IS-Oil offered by AC and SAP to 21-company group	Re-engineering opportunities; opportunities in partnering with software leaders
Y2K issues require modification or replacement	Mobil doing everything in-house except Y2K		Y2K=opportunity to replace systems, re-engineer
IT Outsourcing:			
Increasing competitive and cost pressure	Need for temporary staff for rapid project completion		Increasing focus on customer service creates opportunities; HR crunch will drive increase in outsourcing
Staffing increasingly expensive to retain; skills not up-to-date	Chevron will transfer staff to EDS		
BPO - Finance & Admin:			
Cost pressures; competition	Need to outsource fin. and accounting; e.g. Mobil US Exploration & Production outsourcing to PW Energy 9/97	AC/BP	Business process re-engineering opportunities

SERVICE TRENDS

TREND	EXAMPLE/EVIDENCE	TRENDSSETTERS	IMPLICATIONS
<i>BPO - Logistics:</i>			
Tighter integration of supply chain	Need for faster delivery, efficiencies, improved service; e.g., Exxon International outsources gas station management to Siemens Nixdorf		
<i>Emerging Services:</i>			
Desktop & helpdesk services	Distributed computing and globalization; e.g., Suncor Energy outsources desktop/help desk to MCI Systemhouse, 5/97		
Network services (including intranets)		BT/MCI/Microsoft provide managed intranet service (Intranet Complete) to British Gas	Demand for intranet/internet-related services likely to increase

GEOGRAPHIC TRENDS

TREND	EXAMPLE/EVIDENCE	TRENDSSETTERS	IMPLICATIONS
Overall			
Globalization	Need for standardization, reach		
Y2k problems			
Cost pressures			
Pooling of resources creates client clusters		AC/IS-Oil; EDS/ETAP	Opportunity for new services targeted to a particular set of customers
Americas			
Distributed computing	Driving need for desktop, help desk, net management, Internet-related services		
Emphasis on core competencies	Driving demand for outsourcing; sometimes on selective basis		
EMEA			
Replacement of old systems with client/server	Eastern European countries need new C/S-based applications; e.g., EDS providing C/S Customer Information System for Prague Gas Works, 4/97		
Customer groups pooling resources	ETAP (Eastern Trough Area Project) - JV of 6+ companies, led by BP		Emerging opportunity to service groups with common problems/goals
Cost pressures drive outsourcing	HR costs contributing;		
Euro conversion			
Asia Pacific			

DEAL ARCHITECTING AND PRICING TRENDS

TREND	EXAMPLE/EVIDENCE	TRENDSETTERS	IMPLICATIONS
<i>Deal Architecting</i>			
<i>Teaming Relationships</i>			
Teams of vendors responding to a single client with multiple needs	Nova Gas Transmission hires IBM/DMR team (IBM for ITO/desktop/telecom and DMR for application management)		
Teams of vendors responding to user teams	EDS and Gensym (software co.) provide services to ETAP team led by BP		
<i>Pricing</i>			
Risk/reward basis			

Getting More Miles From IT

THE OIL INDUSTRY IS A CUT-throat business. When revenues are squeezed, the first thing on the chopping block is the cost of overhead. Like their counterparts in other industries, technology managers at oil companies are having to work hard to cut costs while continuing to deliver cutting-edge technology that will make their companies more competitive.

"Basically, it's a 'do more with less' situation," says **Gary Richardson**, IT director at **Star Enterprise**, a joint venture of **Texaco Inc.** and **Saudi Aramco** that sells Texaco products in 26 Eastern and Gulf Coast states and the District of Columbia. "Business managers today are willing to kill their mothers to cut cost, and if you're not paying your way, you're gone."

Cost-cutting pressures have become the mother of invention for oil companies. The most visible offspring of cost-cutting is point-of-sale technology. The "pay-at-the-pump" strategy can entail more than selling gasoline. At Chevron's gas stations west of the Mississippi, it means Big Macs and fries, too.

Tremendous Cost

"The cost of physical property is tremendous," says **Dave Mitchell**, Chevron's general manager of application technology. To bring down real estate expenses, Chevron is teaming with McDonald's Corp. in a joint venture to share facilities. That means combining the IT resources of the two companies and adding a selection of McDonald's products to Chevron's point-of-sale system.

But the high-tech offspring of tighter spreadsheets aren't limited

to burgers. Station fuel delivery costs are also a target for IT. "We're using fuzzy logic to predict consumption at stations," says Mitchell. "Now, stations can run with 20% less inventory."

Perhaps the single largest spawn of the cost-cutting urge is a movement toward a standard client-server software platform for the oil industry. SAP, Andersen Consulting, and much of the energy industry have come together to produce a common set of core business applications called IS-Oil, based on SAP's R/3 architecture.

IS-Oil is essentially a shrink-wrapped version of SAP's R/3 version 3.0, enhanced for the oil industry based on requirements defined by the IS-Oil consortium. Andersen Consulting has also co-developed a version of IS-Oil modified for the "downstream" segment of the industry, which is everything after the oil-refining process, from distributors to gas stations.

But how do oil companies using IS-Oil expect to gain a competitive advantage when their competitors are using the same software? "The theory is that everything in IS-Oil is the commodity-level stuff," says Richardson. "You then use your

creativity to take advantage of all the data you have in data warehouses and other tools. If you don't have IS-Oil, it's a competitive disadvantage."

In all, 21 oil companies, including Amoco, Chevron, Citgo, Shell, Petro-Canada, and Texaco, have subscribed to the software. "If you think about the fact that SAP R/3 is being rolled out to every oil company in the world, that changes a lot of the way you do business," says Carl Williams, VP of IT at Amoco. "IS-Oil won't replace 100% of what we already have, but it will replace a large portion."

Using what amounts to off-the-shelf software for most core business functions means decreased support and development costs. "Our experience in buying software packages in

the past wasn't very good," says Mitchell. "We tended to 'Chevronize' everything we bought. We were good about not doing that with SAP financials. We stuck to the processes R/3 uses to achieve the full benefit of support."

Chevron has made a heavy investment in R/3. The first U.S. energy company to deploy the core financials of R/3, it now has over 5,000 R/3 users company-wide. "IS-Oil is consistent with where we're going," says



■ For oil companies, cost-cutting pressures have forced a movement toward a standard client-server software platform.

Mitchell. Chevron is even exporting some of its investment in SAP R/3. The company is jointly developing a land-management information system with Andersen Consulting that will interface with R/3. Andersen will market the system.

"Hopefully, we'll profit from the sale of the software," says Mitchell, "while reducing the cost of ownership and support."

But using shrink-wrapped software isn't without its system integration requirements, says Amoco's Williams. That integration includes changes in the way companies do business, he adds. "We will have to change some of our business processes to conform with IS-Oil. There's a tremendous pressure on people in the business units to understand the value created by changing their processes to match up with what's being installed."

Amoco is in the first stages of implementing its business process re-engineering initiative, the Amoco Common Process. The company will move to R/3 in September. IS-Oil will be integrated with the company's new process model.

"There's always resistance to change," says Williams. "There will be people who might not see a great deal of benefit from the SAP IS-Oil software. We have to work with the business units to show the value of the software. We have no authority to ram it down anyone's throat. If it doesn't have any business value, then we shouldn't be implementing it."

The move to R/3-based software also opens up an opportunity for oil

companies to downsize their systems. A version of IS-Oil will be available for the Windows NT platform. "The NT platform is extremely attractive to the energy industry," says Bill Miller, a partner in Andersen Consulting's energy industry group. "They see it as something that will eventually drive their MIP costs down, but they don't see it being there yet. [Windows] NT will get there in one to two years, and companies are looking for IS-Oil to deploy to it."

Internet technology is attractive to oil companies as a role model.

than 25,000 Microsoft Mail users. is testing Microsoft's Exchange E-mail server with about 500 users.

"With Microsoft Mail, the mailbox maintenance was substantial for that many users, which is one of the reasons that Exchange is so attractive," Mitchell adds.

As part of Star Enterprise's implementation of SAP R/3 and IS-Oil, the company is making a massive NT deployment. "We plan on rolling out NT to every desktop, along with MS Exchange and the Office suite—Excel, Powerpoint and Access," says Richardson.

To Use NT Or Not

But Amoco isn't quite sold on Windows NT. "We don't know whether we're going to use NT or not," says Williams. "We will be looking at NT for very specific applications, but not for large-scale

Whether to use Windows NT is the question for Amoco, says VP Williams.



Energy

deployment right now." Amoco's initial SAP deployment will be on IBM's AIX on RS/6000 servers.

One element that doesn't figure heavily in oil industry IT plans is the Internet. While companies are interested in intranet technology, there doesn't seem to be much attraction to the Internet other than as a role model. "There's a wave of interest in the Internet," says Richardson. "However, we have yet to make a case for investing in Internet technology. We're attempting to stay in tune with the changes in this area, but we're not spending significant resources on it."

Richardson adds that most of the interest in the Internet has come from his company's marketing and environmental departments for promotional purposes. As far as using the Internet for business networking, Richardson says, "We are looking at public networking like that, but we're big enough to go to a telecom carrier and do [a virtual private network] with them."

Private Networks

Probably one of the reasons the Internet isn't drawing a great deal of attention is that the major oil com-

panies already maintain fairly substantial private networks for their critical applications. Chevron, for example, uses a VSAT network to link its point-of-sale system. Once a credit card is scanned, the information is bounced off a satellite to a Tandem

Energy Trends

Cooperating on standards:
21 companies subscribing to SAP's
IS-Oil application modules for R/3

Moving or planning to move to
Windows NT as a network operating
system and on the desktop

Using the Internet for marketing
and other applications

multiprocessor system tied into Chevron's mainframe credit-card system, which does a credit check.

"We've looked at a replacement product for the credit-card system," says Mitchell. "But we couldn't find anything in the distributed environment because of the scalability requirements. There are over 30,000 devices in our point-of-sale network,

and it needs very high availability and response time."

Chevron is one of the few oil companies to maintain its own credit-card system. Many, including Amoco, have outsourced their credit-card operations. Amoco has also outsourced its Motor Club membership system and support for some financial applications. IS-Oil, in essence, is yet another outsourcing plan.

Just Another Tool

"Outsourcing is nothing other than another tool in our toolbox," says Williams. "We will be doing some more of it, especially in cases where legacy applications will be replaced by SAP R/3."

Star Enterprise has outsourced about two-thirds of its IS functions and plans to outsource the operation and maintenance of SAP as well.

"Clearly, [outsourcing] will increase over the next two years," says Richardson. Star has employed a hybrid model of outsourcing, meaning that specific skill groupings are contracted through specialized companies. That's just one more way the oil industry is responding to pressures to keep costs low and innovation high.

—Sean Gallagher

RANK	RANK	CII	COMPANY	IS BUDGET	IS BUDGET	TOTAL	TOTAL
1996	1995	INDEX	NAME	1996	1995	EMPLOYEES	IS EMPLOYEES
23	74	38253	WAX Technologies Inc.	\$ 73,000,000	\$ 80,600,000	49,000	390
53	51	30235	Tenneco Inc.*	\$ 106,214,291	\$ 180,000,000	55,000	306
79	47	26035	Amoco Corp.	\$ 401,000,000	—	42,000	2,400
92	166	23752	Ashland Inc.*	\$ 138,337,417	\$ 83,000,000	31,600	477
93	37	23711	Chevron Corp.*	\$ 419,137,846	\$ 346,025,442	45,000	1,446
96	46	22772	Texaco Inc.*	\$ 415,803,461	—	30,000	1,434
158	158	17574	Coastal Corp.	\$ 44,328,000	\$ 44,400,000	15,000	385
164	89	17381	Mobil Corp.*	\$ 851,907,110	\$ 826,088,163	58,000	2,939
178	146	16603	Occidental Petroleum Corp.	\$ 78,000,000	\$ 78,000,000	18,000	500
179	141	16496	Unocal Corp.	\$ 85,000,000	\$ 89,000,000	12,500	310
182	94	15887	Exxon Corp.*	\$1,400,867,760	\$1,057,990,200	86,000	4,832
204	144	14543	Halliburton Energy Services	\$ 108,000,000	—	30,000	125
223	131	13126	Atlantic Richfield Co.*	\$ 206,358,871	\$ 154,415,987	23,000	712
303	230	10475	Phillips Petroleum Co.	\$ 127,790,000	\$ 100,000,000	17,000	800
363	351	8746	Consolidated Natural Gas Co.*	\$ 37,382,894	\$ 18,500,000	7,500	129
436	449	7117	Koch Industries Inc.*	\$ 284,835,600	—	12,000	983
438	394	6986	Enron Corp.	\$ 186,000,000	\$ 151,000,000	7,000	650
447	478	6843	Columbia Gas System Inc.*	\$ 28,785,666	\$ 26,429,464	11,000	103
457	6235	6225	Mapco Inc.*	\$ 37,412,930	—	6,000	129

*IS numbers are informationweek estimates.
See stories starting on p. 44 for explanations of CII Index, IS budget estimates, and IS employee estimates.



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CSC Launches New Global Chemical, Oil & Gas Group

October 9, 1997

EL SEGUNDO, Calif., Oct. 8 /PRNewswire/ via Individual Inc. -- Computer Sciences Corporation (NYSE: CSC) today announced the launch of a new business unit to support the global chemical, oil and gas industry.

The unit -- called Chemical, Oil & Gas Group -- will be headed by Dr. Tom Williams, who will be based in Wilmington, Del. Prior to joining the group, Williams was president of CSC's U.K. Division. He also served as the lead account executive for CSC's outsourcing contract with British Aerospace and earlier helped forge CSC's partnership with General Dynamics.

With revenues this year of about \$500 million, the Chemical, Oil & Gas Group includes about 3,000 industry specialists in North America, Europe and Asia-Pacific. The core of the group includes chemicals specialists in 18 countries who joined CSC as part of its technology alliance announced earlier this year with DuPont. Another strong contributor to the group will be the well-established chemicals practice offered through CSC Ploenzke in Europe. The Chemical, Oil & Gas Group will also leverage CSC's other consulting and outsourcing expertise in this industry, as well as enterprise-wide solutions such as SAP and supply-chain and year 2000 expertise.

The group expects to build a \$1 billion-a-year practice over the next three years.

"Today's chemical manufacturers are looking for new ways to add business value," said Van B. Honeycutt, CSC president, chairman and chief executive officer.

"Increasingly, they're using mergers, acquisitions and alliances to forge new business models and find breakthrough ways to cut costs. A full-solutions provider like CSC is critical in developing a robust business platform to help our clients master change."

A key focus of the group will be to offer clients a new level of global integration. It will apply a common set of best practices around the world; integrate its full range of services, extending from strategy through work design, applications, systems integration and process and I/T outsourcing; and present one face to the customer.

The group's offerings are currently being showcased by a "global solutions lab" that highlights the newest technical and software equipment, as well as best practices and industry-specific solutions that can be customized for clients. Initially based in Wiesbaden, Germany, the lab is the first of several to be launched in North America, Europe and Asia-Pacific.

As part of its new practice, CSC will also draw on a global team of more than 400 SAP specialists who are experts in chemicals and supply-chain issues. Companywide, CSC has more than 1,200 SAP experts, one of the industry's largest teams.

"We plan to make our group a model of the globally integrated organization that chemical, oil and gas companies today need," noted Tom Williams. "What companies want most from their solutions provider is in-depth knowledge of their market; a proven track record; a single point of accountability for their needs; the full spectrum of services that can enhance time-to-market, enable global business control and innovate global supply chain; and consistent business-led methodologies clients can

adapt anywhere around the globe.

"Our strategy is to lead this industry by bringing these strengths to the market, as demonstrated by several new contracts with Hoechst, Bayer, BASF and Novartis."

In May, CSC signed one of the largest technology services agreements in the industry with DuPont. The company currently supports DuPont with software and applications services, including a full range of SAP, European and Canadian applications, as well as those specific to the company's strategic business units. CSC is also managing DuPont's global information systems and technology infrastructure, including hardware, software and telecommunications, as well as 60,000 desktop units and disaster recovery functions.

CSC had \$5.8 billion in revenues for the 12 months ended June 27, 1997. The company has nearly 44,000 employees in more than 600 offices worldwide and provides clients with a wide range of professional services, including management consulting, information systems consulting and integration, and operations support. More information about Computer Sciences Corporation is available at <http://www.csc.com>.

SOURCE Computer Sciences Corporation

/CONTACT: Mary Rhodes, 847-446-5461 or Bruce Plowman, 310-615-0311//Web site: <http://www.csc.com/> (CSC)

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CONTRACT PROFILE

EDS (+ Gannett) / Eastern Trough Area
(Vendor)(Customer) Proj. (ETAP)

CODE #: _____ DATE (month/yr.): 1/98

CONTRACT TYPE (Overall) STS

CONTRACT COMPONENTS

- ☐ Management Consulting (MC)
☐ Strategic Consulting
☐ Operations Consulting
☐ Technology Consulting
☐ Other
☒ Systems & Technology Services (STS)
☐ Systems Development
☒ Systems Integration
☒ Systems Management
☐ Other
☐ Y2K Services

- ☐ Business Process Management (BPM)
☐ Customer Care Management
☐ Supply Chain Management
☐ Accounting Management
☐ Other
☐ Electronic Markets (EM)
☐ Interactive Marketing
☐ Intranets, Extranets, Web Hosting
☐ Electronic Payment Services
☐ Other

CONTRACT EMPHASIS (High Value vs. Low Value): _____

CONTRACT DETAILS

Absolute Total Contract Value (\$M) _____ Value Range (A-G*) _____

Annual Contract Value (\$M) _____

Pricing Details _____

Years _____ Length Range (A-E*) _____

New/Renewal/Expansion/Modification/Termination/Switch _____

Contract Description Integrated Prod'n Mgmt. Location Advisory Spt.

Prod'n Location Advisory Spt., capacity allocation spt.

COMPETITION

Competitor 1 _____

Reason For Loss: _____

Competitor 2 _____

Reason For Loss: _____

Competitor 3 _____

Reason For Loss: _____

CUSTOMER CHARACTERISTICS

Industry Proc Mfg Size (Annual Rev. in \$M) _____

Country USA

Region: Americas ☒ Europe/Middle East/Africa ☐ Asia/Pacific

Existing Customer? _____

COMMENTS

ETAP is a 1st. Proj. of BP, Shell, Esso, Agip, Total, Murphy

SOURCES

Gannett, Betty Gannett 617 588 9241; + Marx

EDS: Call Bill at 412 244 4224
(e-mail: will@efg.bdl.sch.edu.com)

EDS will develop 17 infrastr. to support prod'n mgt.
ops of the Central Processing Facility. to start will use Gannett
at 1st. IPM (see above). EDS will integrate sup. + new spt.

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EDS and Gensym Awarded Contract for Eastern Trough Area Project Oil Field Production Management System

January 19, 1998

CAMBRIDGE, Mass.--(BUSINESS WIRE) via Individual Inc. -- Jan. 16, 1998--

ETAP enables cost-effective development of largest combined oil field in the North Sea

EDS, a leading global information services provider, and Gensym Corp. (NASDAQ:GNSM), a leading provider of software and services for intelligent systems, have been awarded the contract to develop an oil field production management system for the Eastern Trough Area Project (ETAP) in the North Sea. The initial phase of the project, Integrated Production Management, involves several worker-years of joint effort that is scheduled to be completed by the end of March 1998.

A joint project of BP, Shell, Esso, Agip, Total, Murphy, and Moeck, ETAP initially entails the integrated development of seven oil and gas accumulations in the North Sea. Because each of the fields is small, they would not have been commercially viable as stand-alone projects. However, by combining reserves, ETAP will be the North Sea's largest field development effort in the last ten years. ETAP is unique, as companies holding different interests in each field have agreed to design and construct shared facilities, with BP as the operator, thereby significantly reducing capital and operating costs.

ETAP will have a Central Processing Facility (CPF) that will also act as an export hub for all the oil and gas produced. EDS is responsible for the development of the IT infrastructure to support the production management operations of the CPF. On the EDS consultants' recommendation, BP determined that Gensym's intelligent G2(R) software was "best of breed" to meet the requirements of the Integrated Production Management Environment (IPME) of the CPF. The three main elements of IPME are an operator advisory system, a production forecasting system, and a capacity allocations system.

In addition, EDS intends to use G2 as the "glue" that binds together all the new and legacy systems. "G2 is an excellent tool to use as an integration platform, because it can be seamlessly linked to a wide variety of real-time data systems and databases," says Alison Taylor, Senior Business Consultant at EDS. "G2 offers object-oriented technology, an intuitive graphical user interface, and natural language capabilities.

As a result, we expect that we can deliver the final system ten times faster compared to traditional software development tools. Furthermore, maintenance costs for a G2-based system will be significantly less than those of a system developed with conventional programming techniques."

Founded in 1986, Gensym Corp. is a leading supplier of software and services for intelligent systems that help organizations manage and optimize complex dynamic processes. Common applications include quality management, process optimization, dynamic scheduling, network fault management, energy and environmental

management, and abnormal situation management. Gensym has sold more than 7,000 product licenses to organizations in manufacturing, communications, aerospace, transportation, finance, and other industries. Based in Cambridge, Mass., Gensym has offices in North America, Europe, Africa, and the Pacific Rim. Visit Gensym on line at <http://www.gensym.com>.

EDS, the official information technology provider for World Cup 1998, is a leader in the global information services industry. The company's approximately 100,000 employees specialize in applying a range of ideas and technologies to help business and government customers improve their economics, products, services, and relationships. EDS, which serves customers in 42 countries, reported revenues of \$14.4 billion in 1996. The company is independent and publicly owned, and its stock is traded on the New York Stock Exchange and the London Stock Exchange. EDS can be visited via the Internet at <http://www.eds.com>.

This document contains certain forward-looking statements as that term is defined in the Private Securities Litigation Reform Act of 1995. For this purpose, any statements contained herein that are not statements of historical fact may be deemed to be forward looking statements. Without limitation, the words "expect that," "scheduled to be", and similar expressions are intended to identify forward-looking statements. Such forward-looking statements are subject to risks and uncertainties which could cause actual results to differ materially from those anticipated. Such risks and uncertainties include, but are not limited to, fluctuations in customer demand, intensity of competition from other solutions vendors, as well as other risks included in Gensym's Form 10-Q for the quarter ended Sept. 30, 1997, as filed with the Securities and Exchange Commission.

Editors: Color photography is available from Gensym. Gensym and G2 are registered trademarks of Gensym Corp.

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Enron Corp. Moves to Hasten Expansion With Plan That Draws Fire From Peco

By JOHN R. EMSHWILLER
Staff Reporter of THE WALL STREET JOURNAL

In a novel attempt to speed up its entry into new markets under utility deregulation, Houston-based Enron Corp. asked Pennsylvania officials for authorization to provide electricity in the Philadelphia area, offering an upfront payment of \$5.46 billion.

Enron's proposal, which was assailed by Peco Energy Co., the utility that currently serves Philadelphia, essentially would insert the Texas company between Peco and that utility's current customer base. Enron said it would contract with Peco to continue providing those customers with electricity as well as other services, such as billing and repairs.

In return, Enron would give customers a 20% rate reduction, effective next September, and has offered to pay Peco \$5.46 billion to help it recover its investment in uneconomic plant and equipment. The \$5.46 billion would be recovered through future charges to customers.

Rivals Restructuring Plan

The Enron proposal is designed to compete with a restructuring plan Peco has already filed with Pennsylvania regulators. Public hearings on that plan are scheduled for next week. Pennsylvania, like other states, has been moving to reorganize its electric-utility industry to open it to more competition. Among other things, the Peco plan proposes a 10% rate reduction to consumers next September.

Steven Kean, Enron senior vice president, hailed Enron's proposal as "an unprecedented move, that shows that policy makers can do better than just cutting a deal with the local utility for a small rate reduction and rules that preclude meaningful competition." Enron officials said this was the first time that a company had attempted to move into an electric utility's service territory in this manner.

Peco officials objected to the Enron plan and challenged some of the economic claims. Enron "wants to be an intermediary" in Peco's electric market "but isn't adding any value" in the process, said Thomas Hill Jr., Peco's controller. Mr. Hill acknowledged that while Enron's initial proposed rate reduction was larger, he said Peco's proposed rates over the longer term were competitive.

Peco officials also said that Enron's

proposed \$5.46 billion payment would involve the sale of bonds by a financing entity to be created by Peco. Enron would purchase those bonds with the proceeds going to Peco. However, Peco officials said the proposed interest-rate on those bonds was high enough that they could easily be resold or refinanced by Enron. Enron's Mr. Kean said his company is looking at packaging some or all of the proposed bonds for resale.

Aggressive Reputation Cited

Initially a natural gas-transmission company, Enron has won a reputation as being one of the most aggressive firms in the budding era of electric-utility deregulation. Seeking to become a major player in the electric industry, it spent \$2.1 billion in 1996 to acquire Portland General Corp., a big electric utility that serves parts of the Northwest. Enron has been advertising heavily to boost its name recognition.

Under its Pennsylvania proposal, Enron would become the "default" electric provider in place of Peco, which currently has about 1.5 million electricity customers. This means that as electric competition opens up in Pennsylvania, the default provider gets those customers who don't choose some new provider. Some 30 wholesale electricity providers have expressed interest in selling in the state, said a spokesman for the Pennsylvania Public Utility Commission.

If it became the default provider, Enron would seek to entice customers to switch to an electric-purchase plan that would provide more revenue to the company. "To the extent we get [customers] to switch, we receive a revenue stream," said Enron's Mr. Kean.

A spokesman for the Pennsylvania Public Utility Commission said his organization hadn't yet been able to study the Enron proposal and wouldn't yet be able to comment.

Enron's forays into the electric-utility industry haven't met universal approval in the financial community. Gary Hovis, director of utility research at Argus Research Corp. in New York, decries what he calls Enron's "Hula-Hoop Investments" in the electric-utility sector. Adds Mr. Hovis: "I would be much happier if Enron would get back to its knitting," which he defines as the company's natural-gas transmission business.

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>From michael.a.organ@ac.com Tue Jan 13 23:01:39 1998
To: sherry sumits <sumits@input.com>
Cc: "jill e. posnick" <jill_e_posnick@anderson_wo@notes2.compuserve.com>
From: "michael.a.organ" <michael.a.organ@ac.com>
Date: 13 Jan 98 21:51:51
Subject: Outsourcing Trends in the Oil & Gas Industry

Using consulting hours, on a 'best efforts' basis, could you please complete the attached chart for trends in the Oil & Gas industry?

The information is needed by next Tuesday, January 20. Please forward the results to me and jill.e.posnick@ac.com

Thank you,
Michael



OILGAS1.DOC

F A X

.....

To: Sherry Sumits
Company:
Fax number: +1 (800) 3794107.....2196850506,,16509613966
Business phone:

From: Michael Organ
Fax number: +1 (312) 335-8006
Business phone:
Home phone:

Date & Time: 1/14/98 10:35:30 PM
Pages: 4
Re: Attachment for Oil & Gas Industry Information Request

Sherry:

Please use a format similar to the one shown in the attachment to respond to the Oil & Gas industry information request.

Thank you,
Michael

PERSPECTIVES



Making the Supply Chain a Competitive Weapon in the Energy Industry

Faced with deregulation and escalating competition, today's electric and gas public utility is changing rapidly. Further, revolutionary technology, as evidenced by the Internet, has opened up entirely new business opportunities worldwide. As the leaders in this industry focus on survival and growth beyond the year 2000, they are beginning to realize substantial cost reductions and improvements in customer service through fresh approaches to managing the supply chain. In this article, Peter K. Punwani and Christopher J. Trump explore some of the key trends related to exploiting the supply chain as a competitive weapon. They discuss five keys to unlocking the potential that lies dormant throughout the industry, and they include a brief overview describing how to implement these ideas.



acquisitions. Mergers. Alliances. Disaggregation. These terms are becoming increasingly familiar to energy executives. To put it mildly, the energy industry is undergoing fundamental and radical changes, which will become even more dramatic in the next few years. Wholesale wheeling is already a reality. Retail wheeling is just around the corner. The days of the last remaining regulated monopoly are numbered: vertically integrated utilities operating in protected markets will disappear — and industry leaders are struggling with how best to organize for competition.

In addition, several electric and gas providers have merged recently, creating full-service energy companies. Consolidation between energy companies and providers of services such as telecommunications and cable is another increasing trend. Basically, if an enterprise has access to customers through existing wires, pipes, or cables, it is a candidate for an alliance. Disaggregation also will increase as vertically integrated energy companies, depending on chosen strategies, divest themselves of generation or transmission and distribution (T&D) assets, or both, and seek to become full-service energy companies.

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ABOUT THE AUTHORS

Peter K. Punwani, top, a partner with CSC's National Energy Practice, directs supply chain business process reengineering and systems implementation in the energy industry. He has helped more than 40 companies improve their bottom-line performance by focusing on supply chain processes.

Christopher J. Trump, a principal in the practice, helps electric and gas companies and nuclear power plants improve supply chain performance through process redesign and system implementation.

The Challenge for Supply Chain Management

The need to reduce costs is pervasive throughout the energy marketplace. Energy is a commodity. And in a commodity market, only low-cost providers survive. Increased competition will, for example, drive the price of electricity ever lower, with estimates as low as three cents per kilowatt-hour at the wholesale level. Supply chain management (SCM) can help reduce cost per kilowatt-hour by focusing on the internal processes and external suppliers that provide material and services. Why is this so important? Because for a typical utility, the dollar volume of material and services purchased for capital and O&M purposes represents almost half of non-fuel operating expenses — more than \$500 million for larger utilities.

However, simply reducing the costs of material and services is not enough. SCM must consider the larger picture and balance cost reduction with the need to keep the system running reliably. It serves no purpose to cut inventories in half if internal service levels suffer. Unscheduled outages can cost hundreds of thousands of dollars per day. Costs must be reined in rationally so that as they are driven from the supply chain, service levels can improve.

Some energy industry leaders have demonstrated that effective supply chain management can:

- Cut lead times by as much as 95%
- Reduce inventory carrying costs substantially
- Lower costs of supply chain processes by 20%-60%
- Reduce prices paid for material and services by 3%-10%
- Provide faster and more complete information for financial and operating decision-making.

Applying World-Class Supply Chain Principles to Utilities

What is a supply chain? In manufacturing, it refers to the relationships and flow of material between an enterprise, its suppliers, and its customers. It includes external entities such as raw material and spare parts suppliers; internal entities like requisitioners, raw material inventory, work-in-progress inventory, finished goods inventory, purchasing, accounts payable, production, customer service, and distribution; and, finally, the ultimate customer. Implementation of SCM concepts is a

major reason that manufacturing in the United States is consistently rated as the world's most productive. Why? Because getting material and services to the right place at the right time improves efficiencies throughout an operation.

How can SCM practices be applied to energy companies? Utility procurement and materials management activities typically are driven by construction, operating, and maintenance needs, rather than manufacture of goods. As with manufacturing, a well-conceived supply chain should ensure that material is "pulled" on an as-needed basis, rather than maintained at excessive costs throughout points in the supply chain. The energy company supply chain, as illustrated in Figure 1, can be configured to ensure "Demand-Pull" concepts.

Opportunities for improvement exist throughout the supply chain, and can provide benefits along many dimensions. Procurement savings of as little as 1% can return millions of dollars to the bottom line. Inventory reductions can improve cash flow and free up working capital. Better negotiation and management of service contracts can reduce costs considerably. And most utilities can achieve significant benefits by applying proven SCM concepts to their procurement and materials management operations.

AN ENERGY COMPANY "DEMAND PULL" SUPPLY CHAIN MODEL

Energy Company Supply Chain Model

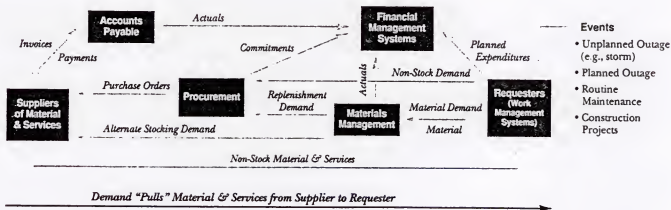


Figure 1

SUPPLY CHAIN EXPENSES ARE SUBSTANTIAL



How well do utilities manage their supply chains? While some excel at a few elements, typically many opportunities are not exploited. In a non-competitive environment, it was easy to institutionalize inefficient processes and practices, such as those listed below.

- ▶ Bidding all orders of more than \$5,000 and using complex, time-consuming processes for awarding purchase orders.
- ▶ Users buying stocked material from local stores at high prices to avoid store-handling charges on inventory issues. To them, the cost is lower, but the company pays more.
- ▶ Phone calls made to management each time material costing more than \$1,000 is requested from stock.
- ▶ Three levels of approval for expenditures of as little as \$100.
- ▶ Buyer performance measured by tracking time spent on more than 15 procurement steps without performance measures related to reducing cost.
- ▶ Accounts payable routing mismatched invoices to purchasing for formal change orders for price variances of just pennies.
- ▶ Paper- and time-intensive service contract management processes that lack true controls.

In short, it is easy to see that such inefficient, cost-generating practices, though once tolerated by customers, no longer are tenable in the impending free-market energy industry.

Five Keys to Energy Supply Chain Management

A price-sensitive commodity market simply will not allow high-cost processes to continue. Therefore, it is incumbent upon energy companies to identify and exploit opportunities to improve their supply chains. These five steps demonstrate how they can do so: simplify the process; recognize the importance of suppliers; leverage technology; focus on internal customers; and adopt a supply chain view.

Redesigning the supply chain is not easy — but it must be done to ensure a strong competitive position.

1. Simplify the Process

Supply chain processes do not have to be complex. However, examples of multiple steps evolving into processes over time are not unusual. Sometimes, one-time events cause implementation of process steps or controls that long outlast their usefulness. Simply automating these processes, without first redesigning them dramatically, is ineffective. Process complexity in SCM falls into two categories: non-value-added activities and excess layers of process control.

Focus on Value-Added Activities

Value-added activities are those that contribute directly to the well-executed completion of a process, presuming, of course, the process itself is value-added. The following two scenarios illustrate how the number of activities and handoffs in a process can differ:

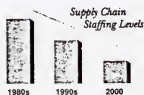
- ▶ An engineer needs a book on advanced circuitry. He fills out a purchase requisition and forwards it to his supervisor for approval. After approval, it is routed to purchasing, where a buyer finds the book for \$45. A clerk enters the purchase order, prints it, and mails it to the supplier. After shipment, the supplier sends an invoice to accounts payable, which mails it to the employee for approval. The employee signs the invoice and routes it to accounts payable, where it is entered and paid.
- ▶ An engineer needs a book on advanced circuitry. Using one of a variety of distributed purchasing options, she buys the book for \$50. At the end of the month, her supervisor receives and reviews a report showing all expenses for her department, including the book. Purchasing and accounts payable are not involved with the specific order.

Purchasing and accounts payable departments process many orders and invoices to which they add little or no value. This can be expensive, as the cost of creating purchase orders can be high — often more than \$75. The process cost to the company in the first scenario was easily twice that described in the second. A better price, yes, but overall, a very expensive book.

Remove Unneeded Layers

The nation's largest retailer made news with its announcement that it would no longer deal with intermediate distributors but, instead, would buy directly from manufacturers of goods. The company is able to do this because its buying clout and sophisticated point-of-sale system allow it to pull demand based on consumption. This retailer devotes only 10% of its store space for inventory, while its competitors average about 25%.

**ENERGY COMPANIES
MUST LEARN TO DO MORE
WITH LESS**



Historically, utilities have operated their material distribution network with district warehouses serving local crews. Usually, a central warehouse transfers material to satellite warehouses which, in turn, issue material to crews. The perception is that service is best provided by a local warehouse. In reality, this arrangement generally results in excess inventory and overstaffing.

Some utilities have achieved success by abandoning this decentralized model in favor of a centralized system in which deliveries are made only to meet planned material needs, thus removing a layer of inventory from the supply chain.

By evaluating unique needs carefully, most utilities can redesign processes and reconfigure logistics to realize significant cost savings without reducing service. Some organizations reduce volume in purchasing and accounts payable by more than 50% while actually improving service to the user community. This reduction enables these companies to focus their procurement resources on activities that really save money — such as negotiating contracts for services or long-term material needs. In another case, an electric utility reconfigured its material distribution logistics to eliminate intermediate warehouses and realize ongoing, annual savings of more than \$4 million.

2. Recognize the Importance of Suppliers

Suppliers are integral to an energy company's supply chain. Historically, however, relationships between utilities and suppliers have been arm's length at best, adversarial at worst. Highly competitive companies recognized years ago the importance of codependency between themselves and their suppliers. In such companies, supplier relationships have been elevated to a strategic level commensurate with their impact on business. Some progressive automakers go as far as lending engineering support to their suppliers to improve their production efficiency, an investment that pays off in reduced cycle times, product reliability, and improved supply chain performance.

Where should an energy company begin to try to get closer to suppliers? Start by identifying high-impact candidates for supplier alliances. Once key suppliers have been classified, companies can establish various arrangements to improve communication and service. These relationships must be beneficial to both parties or they will not survive. For example, if the customer enjoys all the benefits, there is no incentive for the supplier to improve. Ideally, purchasing receives competitive prices and better service, while suppliers get more volume at a fair profit, as well as consistent order flow to help balance production.

It is important to focus on supply chain impacts of supplier arrangements. Consignment stock is an oft-cited achievement of progressive utilities. However, sometimes its impact on the supply chain is minimal because the stock simply has been shifted to the supplier, who still incurs — and passes on — associated costs. True supply chain optimization eliminates inventory from the supply chain, not merely the utility's books.

One Midwestern electric and gas company recently achieved remarkable results from supplier alliances. By reducing its list of qualified suppliers for a key commodity from five to two and entering into longer term contracts, this company has realized three-day delivery commitments, improved quality, and price reductions of up to 15%. In another example, a large petrochemical company achieved similar cost savings and just-in-time responsiveness by setting up a supplier warehouse complex — right outside its own gates!

3. Leverage Technology

Today's technology provides a tremendous opportunity for supply chain integration. Improved integration across supply chain, work management, and financial systems is opening up entire new opportunities for integrating processes and information. Today's client/server solutions make information more user friendly and timely for decision-makers. Electronic Commerce is revolutionizing communications between organizations, their suppliers, and customers. Visionary energy companies are capitalizing on these capabilities.

Integrate Supply Chain Processes

State-of-the-art package software offers powerful new standard features such as electronic approvals for purchase requisitions. Using this feature, one gas utility reduced its average purchase requisition cycle time from 14 days to two by automating the purchase requisition approval routing function and simplifying some layers of approval. However, at another company, the supply chain team questioned the need for such approvals. The result is a streamlined process across work management and purchasing functions that eliminates the need for purchase requisition approvals in most cases.

Integration of supply chain processes with upstream planning processes (e.g., work management, maintenance management) and downstream processes (e.g., financial management) is critical to achieving true bottom-line benefits.

At a nuclear plant, work scheduling was improved significantly through on-line integration of work orders with purchasing and inventory management systems. Using bar-coding technology, work order entry was simplified, making it far easier to enter timely and accurate demand information. In turn, the supply chain systems were linked tightly to financial systems to provide better purchase order commitment information and more realistic detail for activity-based management information. The result is substantial productivity improvements brought about by avoiding duplicate information entry; far better coordination between maintenance and materials planners; and much more useful cost information for decision-makers.

Client/Server Solutions

As the legacy mainframe systems of the 1970s and 1980s give way to client/server computing solutions, powerful, new user-friendly tools are becoming available to support the buyer, planner, and supply chain executives.

For example, in a client/server architecture, buyers can use their workstations to evaluate quotes obtained from different suppliers on spreadsheets, using charts and graphs as needed. This is in sharp contrast to a traditional mainframe environment, in which buyers are forced to endure several time-consuming tasks, requiring a combination of mainframe reports and manual or PC-based steps to produce similar results.

A wealth of allied technologies, such as graphical user interfaces, advanced computer networking, groupware, distributed relational databases, portable computers, bar-coding, and radio communications interfaces are also contributing to increased power and versatility in supporting this distributed environment.

Link Up With Suppliers Electronically

The roots of Electronic Commerce can be traced to Electronic Data Interchange (EDI), a 25-year-old technology that has been in use at energy companies for the past decade. EDI facilitates and expedites communication of business documents between an energy company and its suppliers. By eliminating clerical, mailing, and other costs associated with paper-based information (purchase orders, acknowledgments, invoices, shipping notices, and remittances), EDI reduces costs, processing delays, and errors.

More recently, Internet access has spawned a revolution in Electronic Commerce; it promises to change the ways companies do business almost completely. Supplier catalogs and pricing for many commodities are available on-line today. Experiments with intelligent "agents" that can retrieve information automatically are encouraging and should be appropriate for a variety of business uses. The Internet presents a tremendous opportunity for shared information, as well as transaction processing. Any system development effort undertaken today should incorporate Internet access features to enable users to exploit this exciting new opportunity.

To make the most efficient use of available technology, existing processes must be redesigned. For example, examine supplier payments. Evaluated Receipt Settlement (ERS) — matching purchase orders to receipts to make supplier payments without requiring a supplier's invoice — has brought about significant savings at many companies. A Southeastern electric company improved its integrated processes drastically by using combinations of ERS concepts and EDI technology. The company realized a 60% reduction in accounts payable staff and improved lead times. It also eliminated late payments, leading to better discounts on purchases.

4. Focus on Internal Customers

In manufacturing and distribution, there has been an increased focus on customers during the past decade. Further, market fragmentation has been taken to the neighborhood level for some consumer products. By addressing the needs of ever-specialized groups of customers, companies have enjoyed increased revenue and profitability. For energy company supply chain processes, the needs of customers in generation plants versus T&D can be significantly different. Understanding their needs and priorities is critical to providing them with the right levels of service.

Listen to Your "Customers"

Such internal customers are quite often the best source of information on how well suppliers meet their needs. They work day-in and day-out with contractors and purchased materials. It is vital to involve internal customers in any SCM initiative, and for procurement professionals

to realize whom they serve. Failing to do so can be catastrophic. An example of a seemingly trivial item illustrates this point:

Distribution line crews preferred a brand of tape because it was easy to use. Despite this preference, the purchasing department competitively bid and bought a low-price brand that crews found nearly impossible to use. To get around the problem, crews bought tape at local stores at prices up to 50% more than the purchasing department could have negotiated. In this case, the price difference was insignificant compared with the total cost of buying inferior tape.

Promote Planning

The effectiveness of the materials management function depends on the quality of information it receives. Armed with valid information on historical usage, seasonal demand, planned outages, and scheduled material requirements, material planners can develop and manage a finely tuned supply operation for internal customers.

Conflicting goals between requesting departments and materials management is a common problem for utilities. Materials management is responsible for optimizing inventory levels. But requesters, who actually determine inventory levels by how well they plan, sometimes do not care about inventory. They are evaluated on getting work done so that plant downtime is minimized and customers receive the best possible service. Sometimes, this conflict puts two major supply chain links at loggerheads.

This situation can be improved by sharing information to benefit materials and work management. At one generating plant, the maintenance system was integrated with materials management so that changes to work request schedules updated material requests in inventory management and purchasing systems. This integration allowed up-to-the-minute material availability information for maintenance planners and provided revised upstream customer requirements for material planners. In addition, it allowed the supply chain to approach just-in-time performance as well as inventory reductions of approximately 15%-20%. At the same time, service levels for maintenance planners improved, with the percentage of work orders awaiting materials dropping to less than 1%.

5. Adopt a Supply Chain View

Supply chain activities typically are performed by different organizational units, usually without a common process view. Activities surrounding the replacement of a pole, for example, can involve half a dozen departments, from customer service through purchasing. Most utilities are organized vertically around "functional silos" such as finance, corporate

services, and inventory management. For supply chain processes, this results in accounts payable, purchasing, and inventory management often reporting up to different functional areas — or even split, with each business unit or plant having its own functions.

While not inherently disadvantageous, such an arrangement makes it more difficult to view the various pieces of the supply chain as one integrated process — a process that must work together to reduce costs and serve "customers." Integrating the supply chain requires that the processes composing it be identified and coordinated with common goals and performance measures. A horizontal, business-process focus must replace the typical vertical focus to ensure that handoffs are minimized and that changes benefiting the entire organization can be implemented quickly.

This horizontal view can be achieved in many ways. At one East Coast electric and gas company, cross-organizational teams were established on a permanent basis to address overall supply chain issues. In another case, a large electric and gas utility reorganized its inventory management function by bringing inventory under central materials management. Both companies realized benefits from the changes, including inventory reductions of approximately 15%.

This philosophy can be applied to both vertically integrated and disaggregated utilities. Figure 2 shows how this approach might work at a generation-only company.

Once the supply chain has been identified, energy companies can elect to take advantage of another current trend: outsourcing. While most often associated with information systems departments, outsourcing is gaining momentum in other areas as well. For example, supplier stocking programs are one variant common in today's energy marketplace. The degree to which outsourcing can be applied depends on many complex factors. It should be undertaken carefully, preferably in a series of small steps.

Getting There

Given the rapid restructuring taking place in the industry, and the powerful technology available, many energy companies are moving forward with supply chain redesign and implementation projects to harness the power of streamlined new processes.

A SUPPLY CHAIN VIEW OF AN ENERGY COMPANY PROCESS

Generating Company

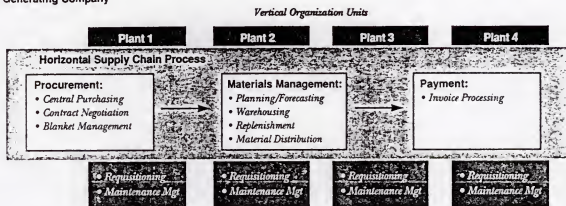


Figure 2

While a handful of companies have been very successful, the vast majority have had project schedules and costs escalate far beyond budget, with a concurrent delay in expected benefits. There are several common pitfalls that seem to plague such efforts. Some can be avoided by paying special attention to three aspects of implementation — business case, change management, and aggressive systems development — discussed in the following sections.

Business Case

Surprisingly, a number of supply chain projects are begun without a well-defined business case that details costs and benefits. These usually are plagued by waning management interest and failing rank-and-file enthusiasm. Given the cross-functional and cross-business unit issues that must be addressed continually in supply chain process redesign, it is difficult to succeed without a clear plan, based on a solid business vision.

Equally important, the development of the business case requires commitment from supply chain executives. Merely wishing for "state-of-the-art" systems is not enough. There has to be a sense of urgency in replacing outdated practices with new ways to manage the supply chain in a competitive environment. This requires an enterprisewide vision that articulates performance goals that drive subsequent planning and prioritization. Clearly quantifying benefits and establishing a timeline for how these benefits will be achieved is key to determining how realistic expectations will be met with supporting changes in organizational structure, culture, processes, and systems.

For example, on one supply chain process redesign project, the team secured commitment from executives to achieve cost savings associated with proposed changes. These benefits were articulated clearly in the final report. Months after the project was over, managers still referred to the report and brought it to meetings. It became part of their goals rather than a "dust collector."

Change Management

Moving to a competitive environment is not easy. Changing ineffective operating habits and beliefs requires major shifts in culture — such as collaboration across functions and business units, risk-taking with partners, rapid conflict resolution, and innovative leadership.

These realities must be recognized while redesigning and implementing new supply chain processes. A management structure, starting with a powerful executive sponsor and a steering group that represents cross-functional and business unit leaders, is important. In structuring a project team, the role of the project manager as a leader, diplomat, and enforcer requires considerable tact, professional skill, experience, and wisdom.

While designing desired future processes, the team must be familiar with utility industry best practices, as well as those in competitive industries. For example, supplier alliance programs in the electric utility industry usually have plenty of room for improvement, compared to the computer accessories, airline, telephone, and chemical industries. Using structured workshops, key stakeholders should participate in developing the process vision of the future, thus allowing their subject matter knowledge of existing processes to be shared across functions. Also, it helps stakeholders become more committed to the success of the environment being designed.

While some business process innovations may require system or technology support, others can be implemented rapidly. A pilot approach is particularly effective for experimenting with and refining such changes. Achieving business results with a series of small successes is fundamental to major supply chain change management efforts.

Throughout the process of implementing change — whether through process redesign, system implementation, or both — it is crucial that the project team understands the balance between various components of the overall business system. As illustrated in Figure 3, the business system comprises systems and business processes as well as organizational, cultural, and external influences. All of these components affect the eventual solution, and must be addressed proactively to ensure success.

Aggressive Systems Development

With a number of client/server packages available in today's marketplace, energy companies face an array of possibilities to support their redesigned supply chain processes. Equally important is the fact that the rapid structural changes taking place in the industry require more flexible and faster implementation of new systems and technologies.

Beyond selecting the right software, however, one of the most common oversights made in such implementation efforts is underestimating the complexity of data conversion and interfaces. Given the strong integration needed for work management, financial, meter tracking, records management, and bank systems, for instance, it is important that sufficient planning go into managing these interfaces with legacy systems or newly developed applications. Also, realization of expected benefits may require higher quality and more accurate data than what currently exists in areas such as vendor files, item catalogs, and on-hand inventory balances.

Perhaps one of the most critical aspects of successful implementation is the ability of business users and information systems personnel to share the vision of how the new system will support future business processes. Traditional system development methodologies call for extensive and exhaustive documentation that freezes requirements too early in the development process. Typically, such approaches result in frustration for business users and systems analysts, who realize too late that what is implemented is not what they had envisioned. Such problems can be avoided by using innovative, rapid implementation methodologies that provide for prototyping of business processes early in the development cycle. This not only helps bring about a common vision early in the game (supporting business process redesign while determining package customization), but also significantly reduces the overall implementation life cycle, allowing benefits to be realized faster.

THE BUSINESS SYSTEM AND ITS ELEMENTS

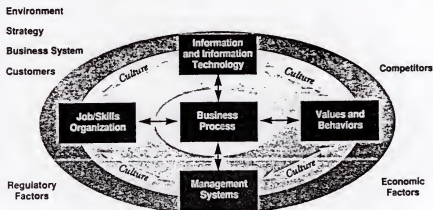


Figure 3

Conclusion

Energy companies have a unique opportunity to streamline their supply chain function to reduce costs and improve their competitive position. Deregulation is a certainty. Energy companies that develop and execute effective cost-reduction and revenue-enhancement strategies will thrive; those that do not will perish.

Benefits of supply chain optimization will not come without investment, hard work, and some "paradigm shifting." The potential rewards, however, are huge. Energy companies that successfully incorporate the principles outlined here, and implement today's powerful technology, will have taken an additional step to distance themselves from the competition — and stake a claim for survival and growth in the 21st century.

